

TEC-V

MILESTONE 4

By: Michael Dowling & Zealand Brennan



CLIENT

- DR. Wood
 - **Professor** | Ocean Engineering and Marine Sciences
 - **Program Chair for Ocean Engineering**



MILESTONE 4:

Tasks	Completion%	Michael	Zealand	To Do
Cloud Plot Application	70%	70%	0%	Finish CSS styling
Application Functions	70%	70%	0%	Implement more options for different file uploads
False Data	90%	90%	0%	Remove more false data
Rotational Compensation	50%	50%	0%	Account for rotation of AUV
Autonomy	30%	0%	30%	Implement Pathway Identification

TOOLS

ROV

- Python
- Data Retrieval

Webpage

- Html + JavaScript
- Environmental creation and control

Autonomy

- Gazebo
- Sensor recognition
- Obstacle avoidance



MILESTONE

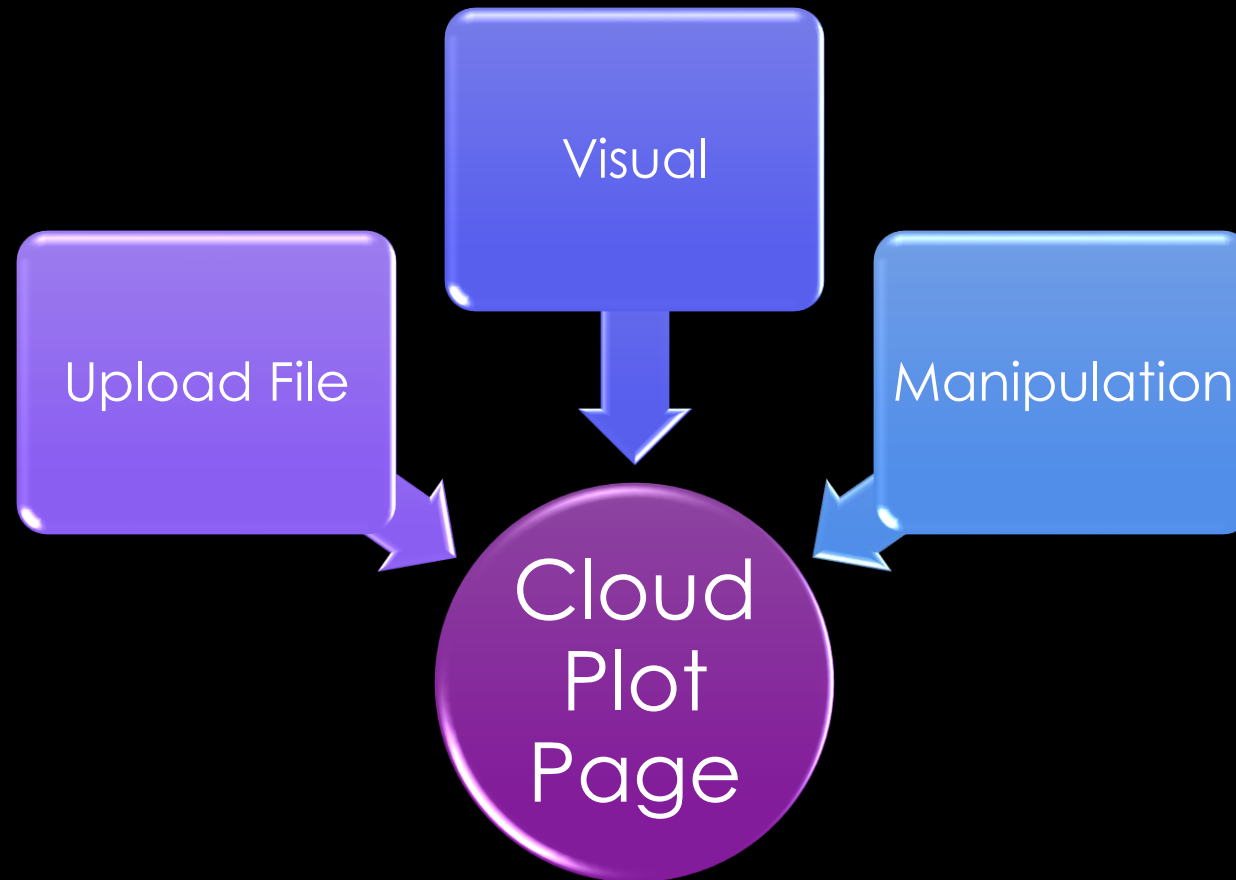
TASKS



CLOUD PLOT

WEBPAGE

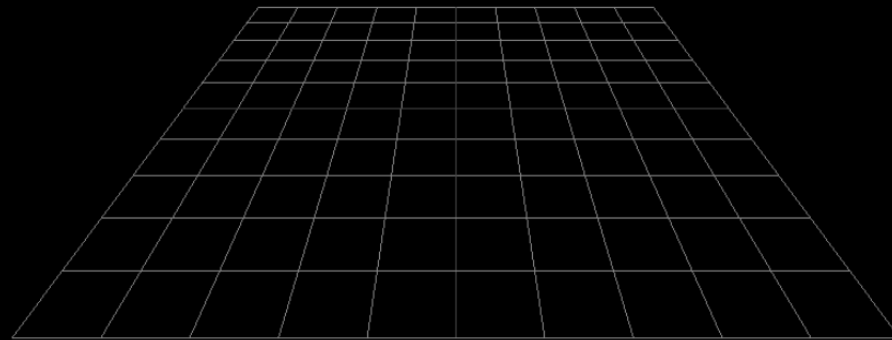
WEBPAGE CREATION



WEBPAGE CREATION - SETUP

Main Components

- Three.js
 - Sets environment
- Orbital controls
 - Zoom in/out
 - Angle manipulation

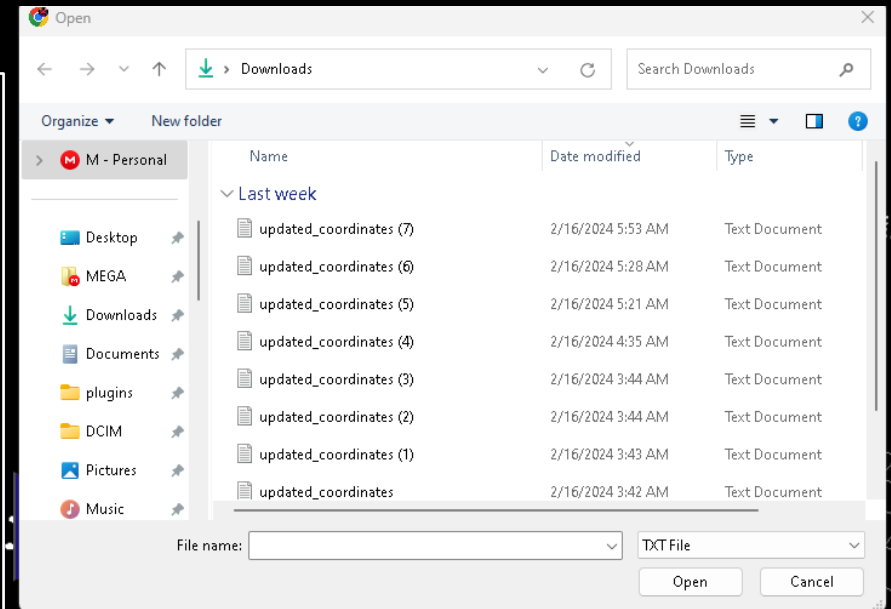


INITIAL FUNCTIONS

Load Coordinates

- Opens file explore
 - Allows only .txt extensions to be selected

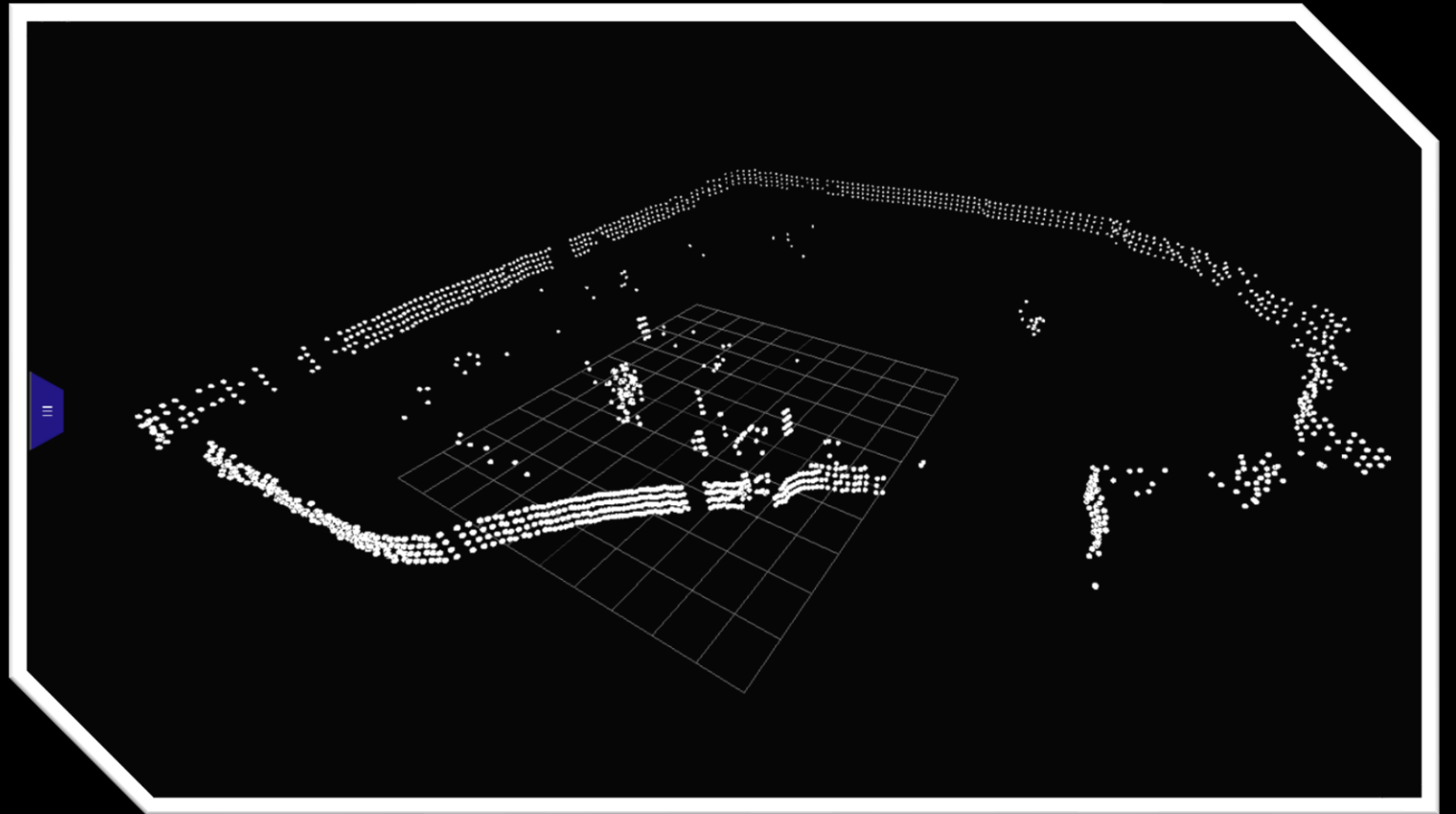
Load Coordinates:



INITIAL FUNCTIONS

Load Coordinates

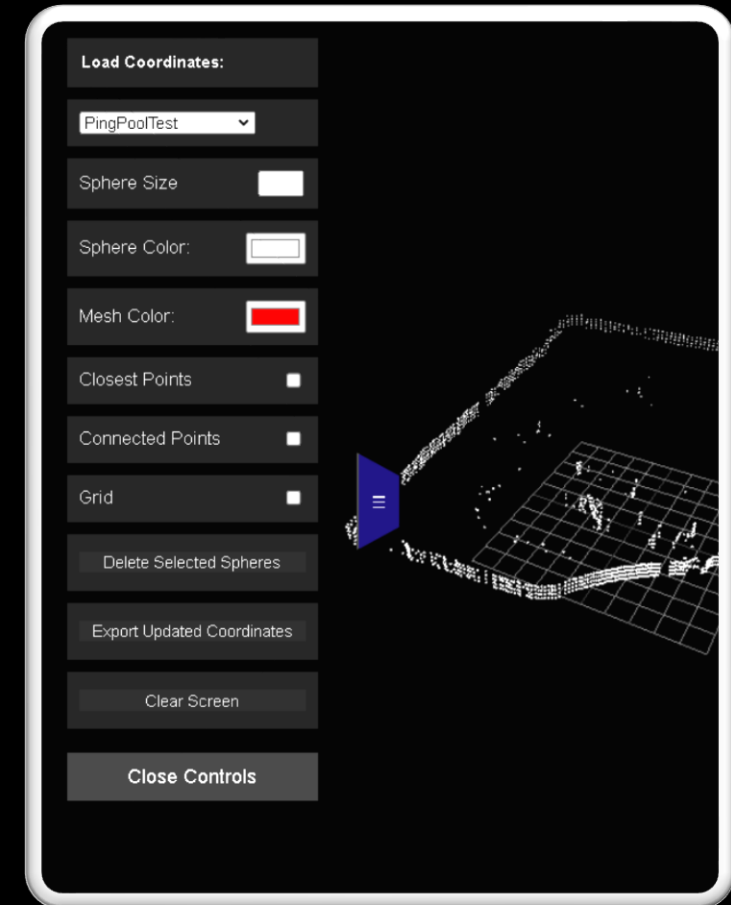
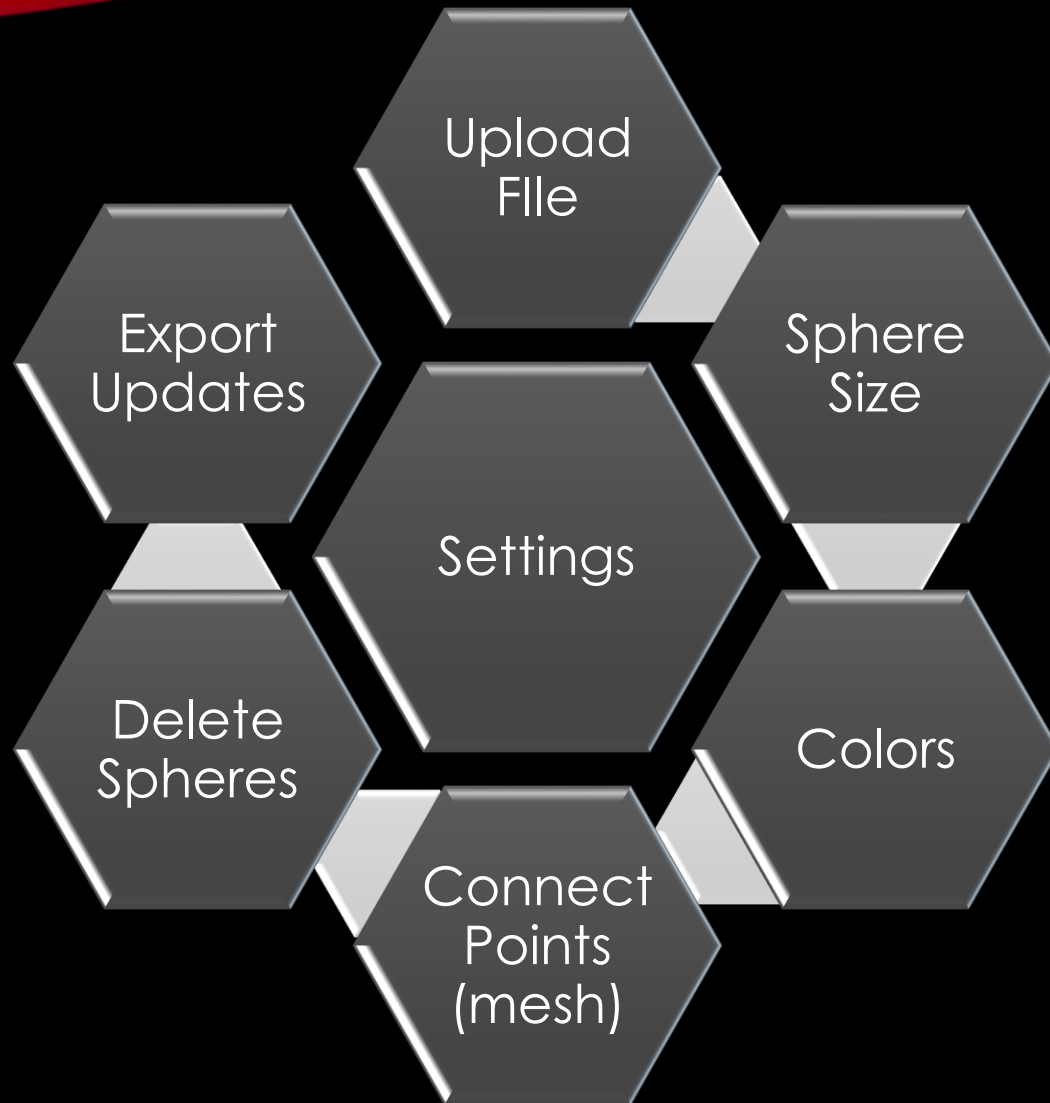
- Code (JavaScript)
 - Reads data from the input file
 - Designates sphere at each coord





NEW
SETTINGS

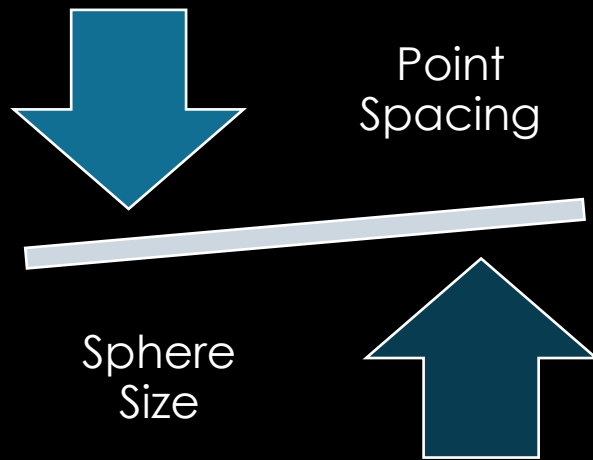
WHAT CAN THE USER ACCOMPLISH?



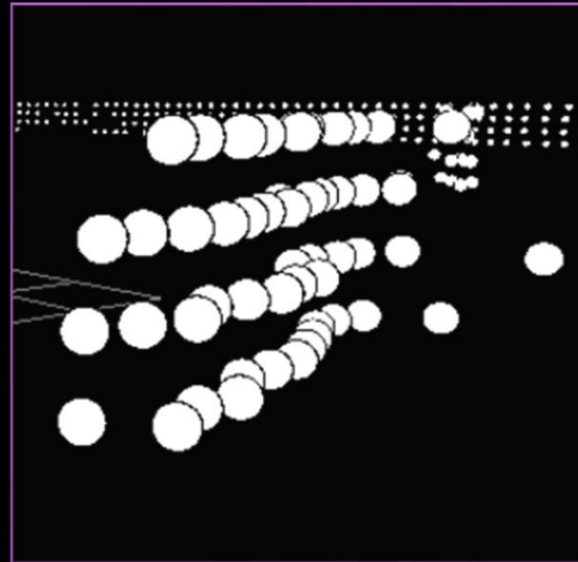
SPHERE SIZE

Reason

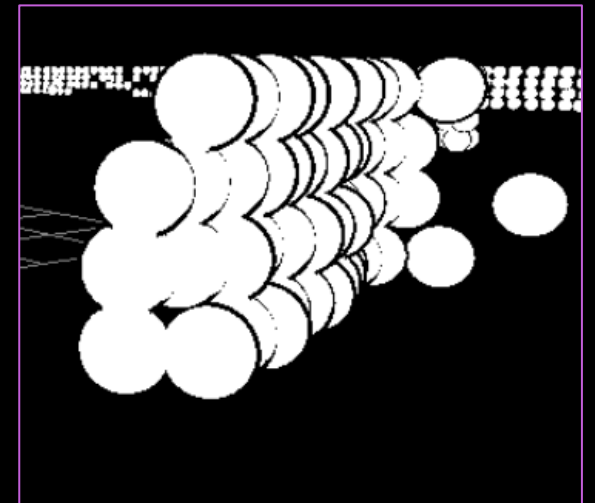
- Spacing between points



Initial Size



x10

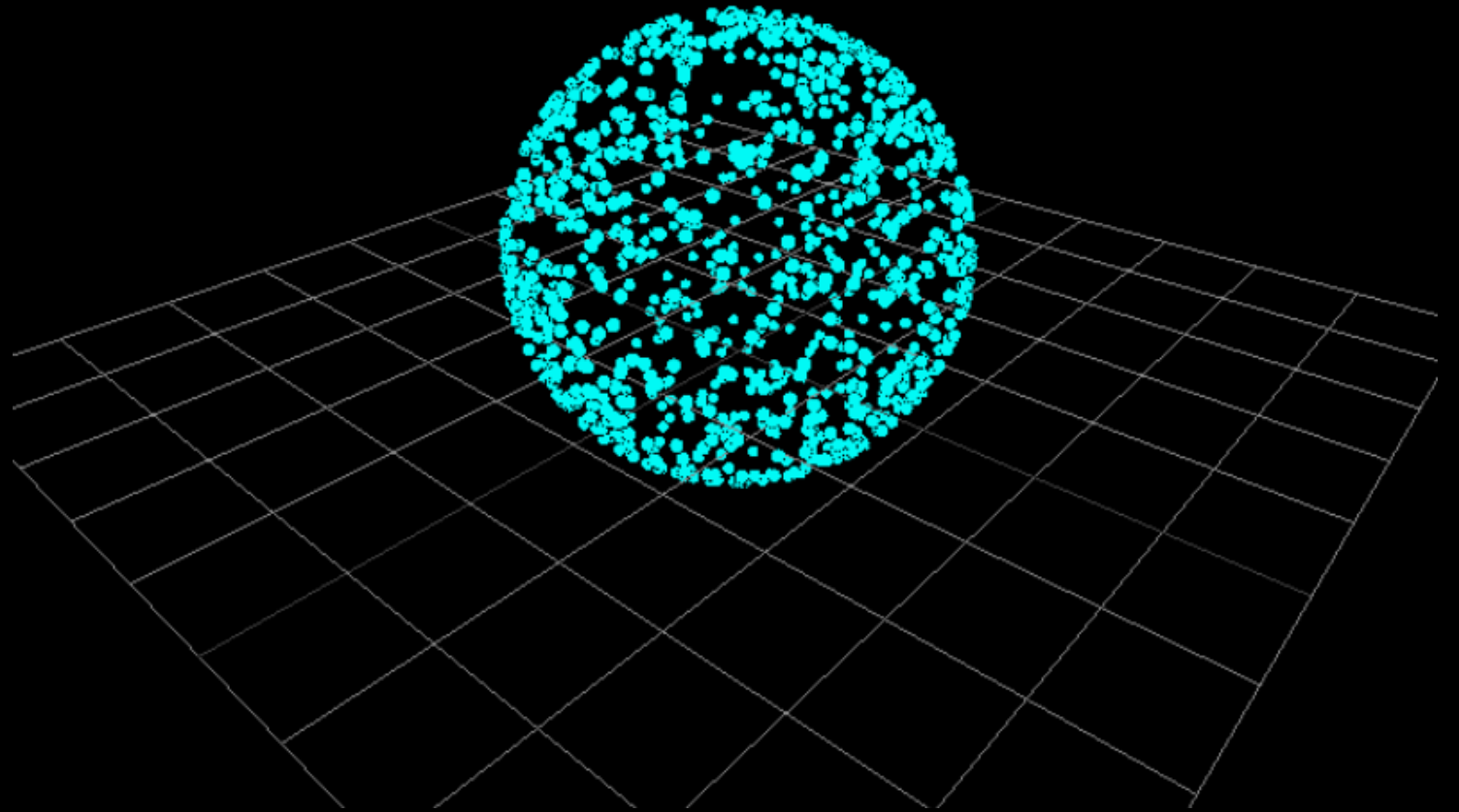


SPHERE COLOR

Sphere Color:



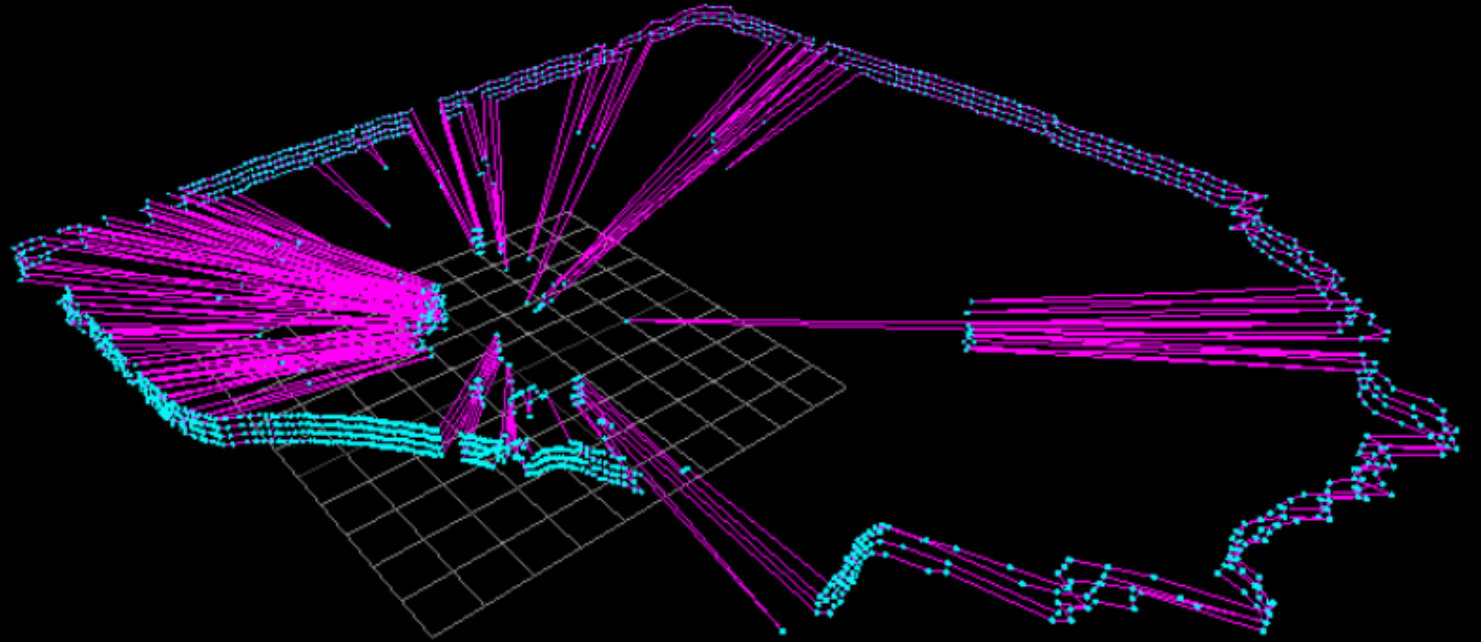
- Opens Color Wheel
- Allows user color options



CONNECTED POINTS

Connected Points

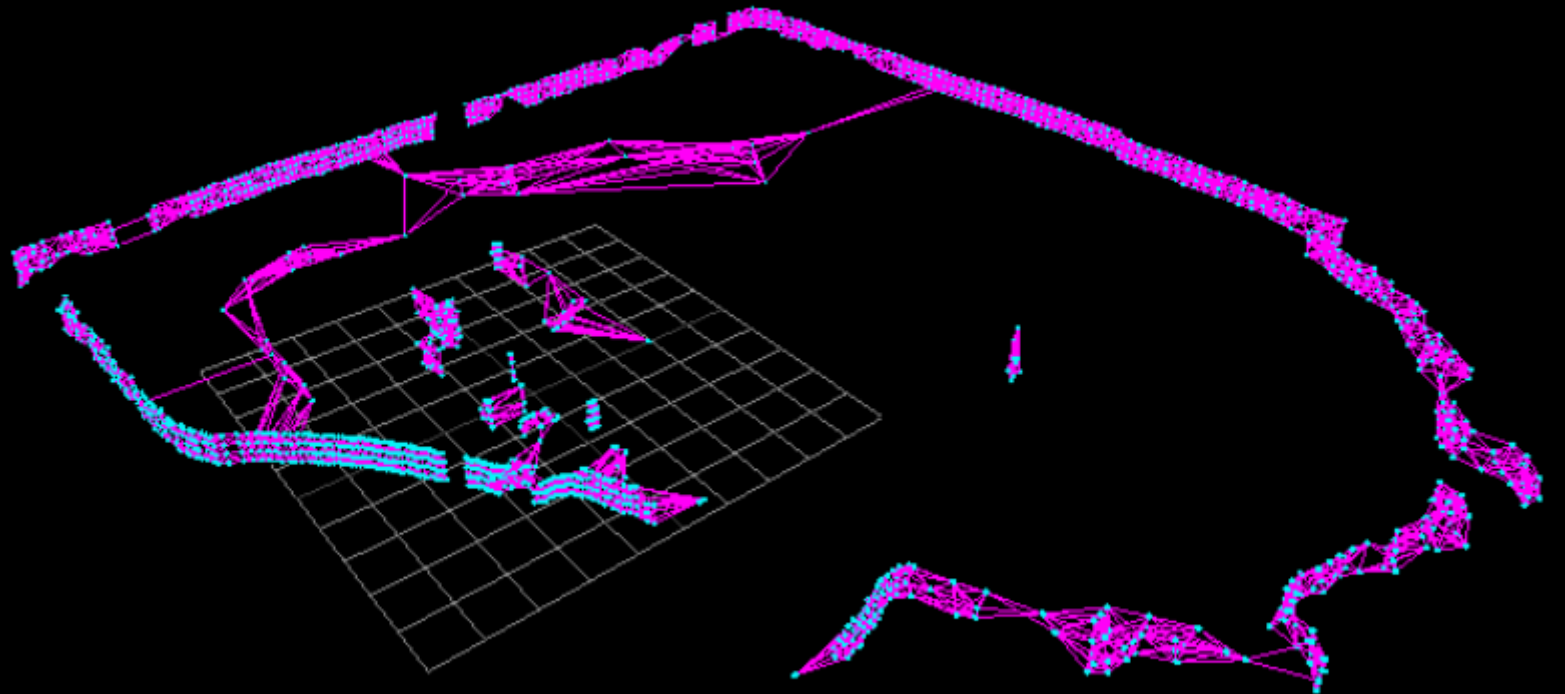
- Looks at the previous point and current
- Places line intersecting these points



CLOSEST POINTS

Connected Points

- Reads from file
- Looks at the current point
 - Finds 8 closest variables
- **Downsides:**
 - Done during file Upload
 - Creates latency





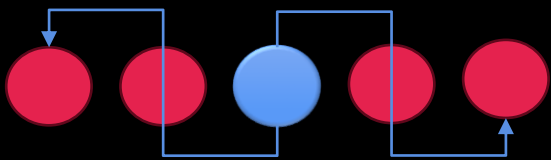
OUTSIDE

INPUT

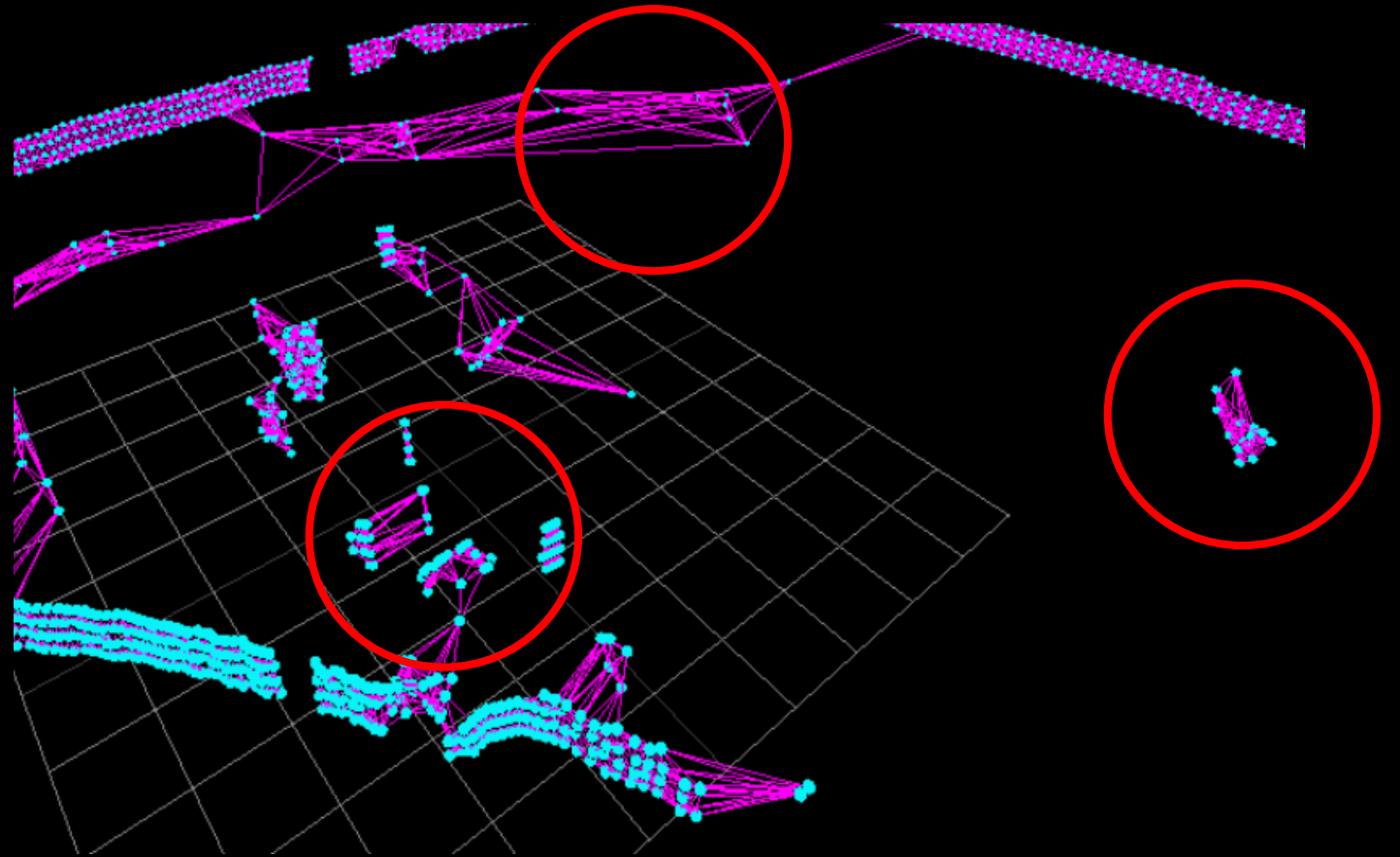
SPHERE DELETION

Problem:

- False Data
- Points that do not exist
 - Original solution



- Downsides:
 - Deletes true points



SPHERE DELETION

Problem:

Each
Coordinate
Point

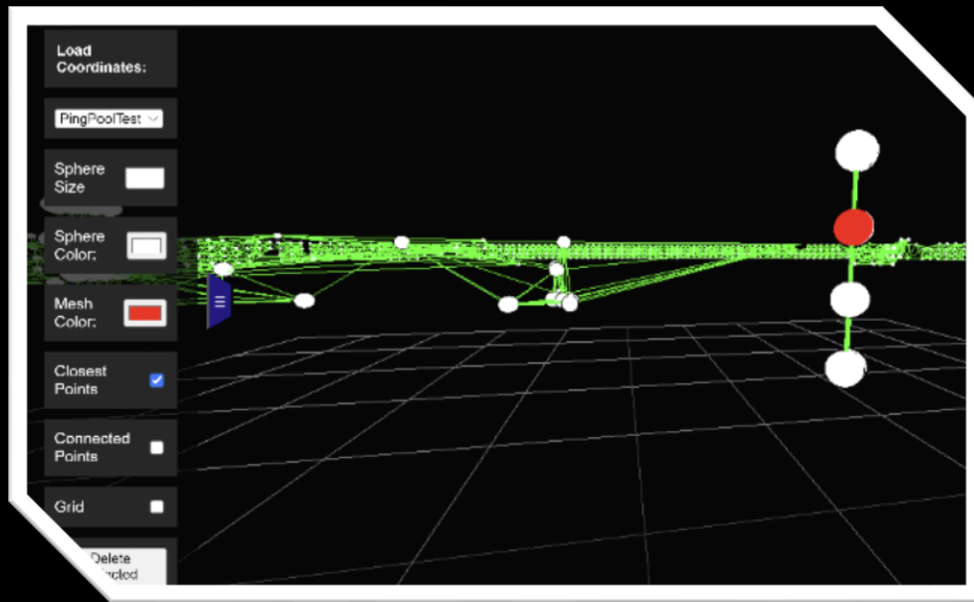
Sphere
Creation

Storage
Array

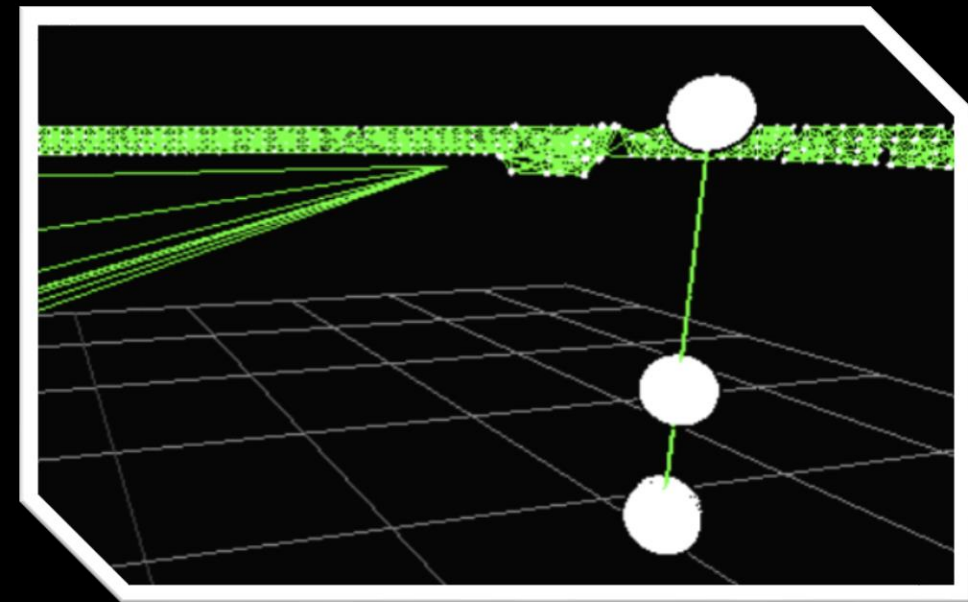
```
359 //=====
360 // Delete Spheres
361 //=====
362 let selectedSpheres = []; // Array to keep track of selected spheres
363
364 function selectSphere() {
365     raycaster.setFromCamera(mouse, camera);
366     const intersects = raycaster.intersectObjects(scene.children);
367
368     for (let i = 0; i < intersects.length; i++) {
369         if (intersects[i].object.isSphere) { // Ensure we're only interacting with spheres
370             const selectedSphere = intersects[i].object;
371
372             if (selectedSphere.selected) {
373                 // Sphere is already selected, deselect it
374                 selectedSphere.material.color.set(sphereColor); // Change color back to default
375                 selectedSphere.selected = false;
376
377                 // Remove from selectedSpheres array
378                 const index = selectedSpheres.indexOf(selectedSphere);
379                 if (index > -1) {
380                     selectedSpheres.splice(index, 1);
381                 }
382             } else {
383                 // Sphere is not selected, select it
384                 selectedSphere.material.color.set(0xff0000); // Highlight color
385                 selectedSphere.selected = true;
386
387                 // Add to selectedSpheres array
388                 selectedSpheres.push(selectedSphere);
389             }
390
391             break; // Stop the loop after processing the first intersected sphere
392         }
393     }
394 }
```

ITERATION 1

Before:

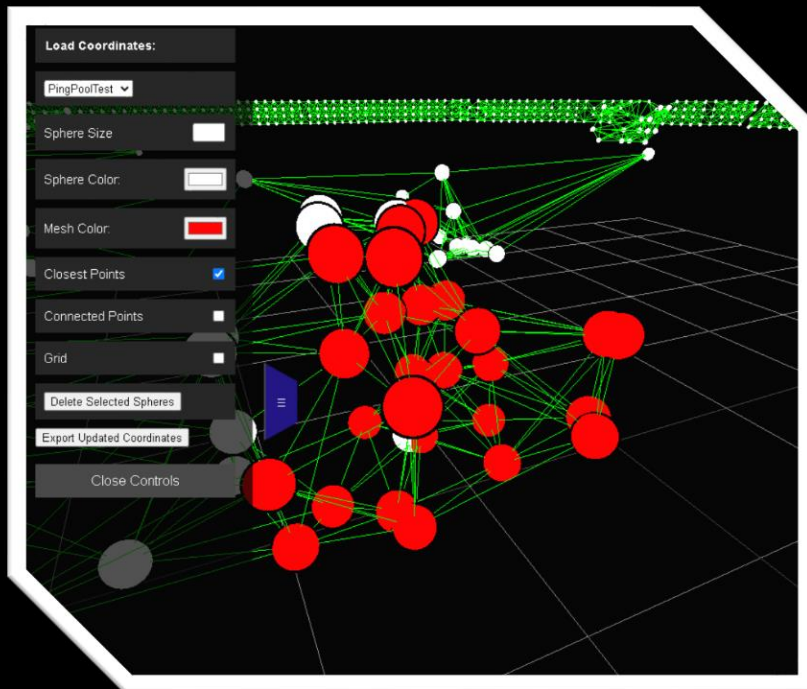


After:

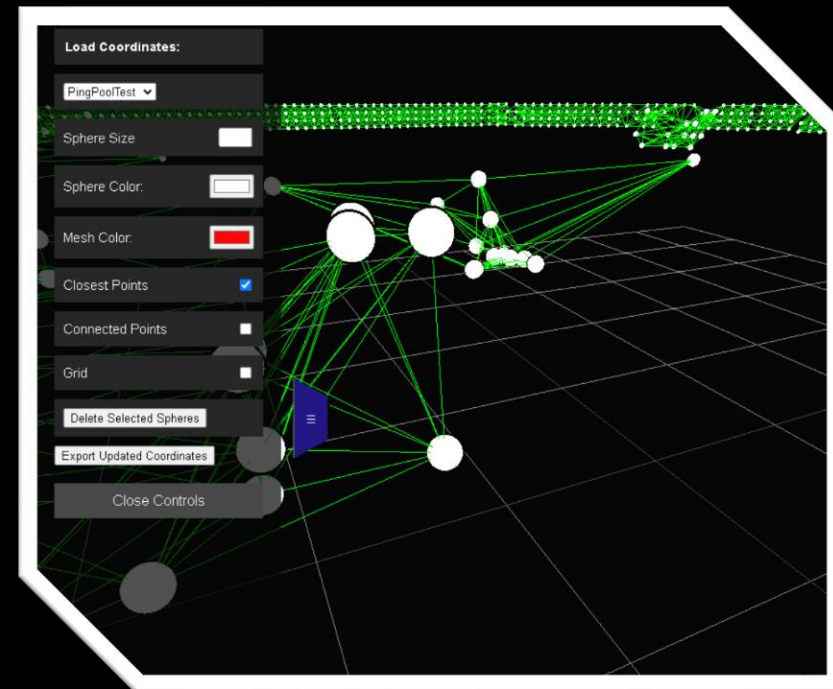


ITERATION 2

Before:

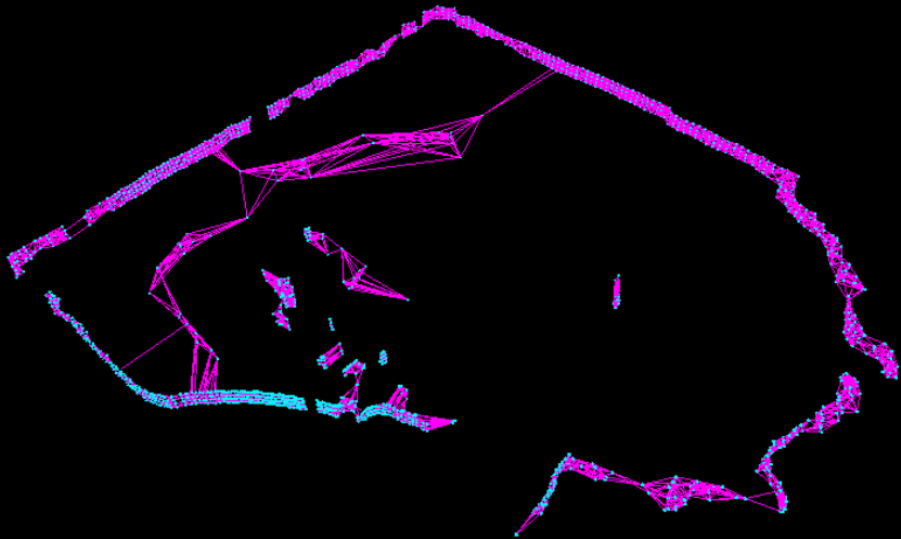


After:



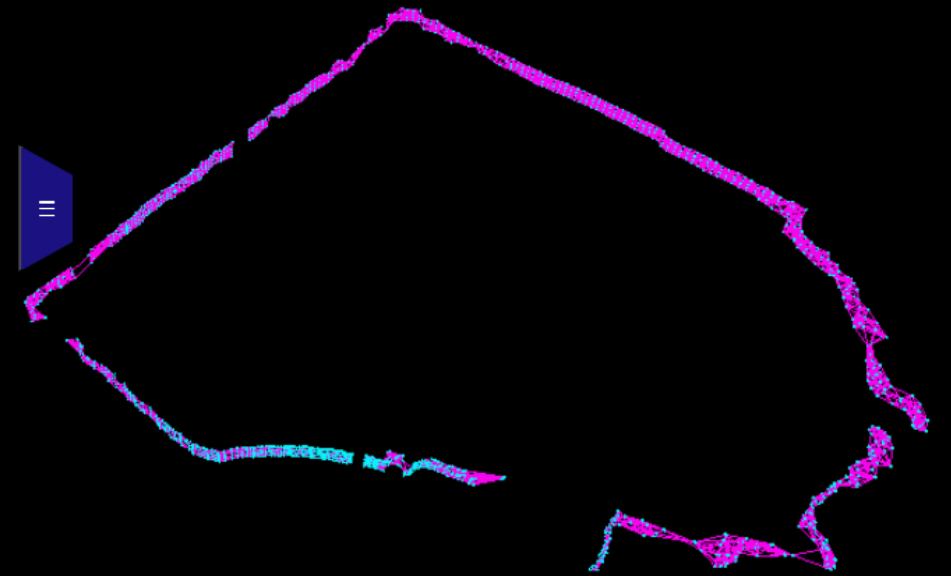
EXPORT UPDATE ARRAY

Before:



- Closest Points
- Connected Points
- Grid
- Delete Selected Spheres
- Export Updated Coordinates
- Clear Screen
- Close Controls

After:





AUTONOMY

GAZEBO

IMU

Orientation

Angular Velocity

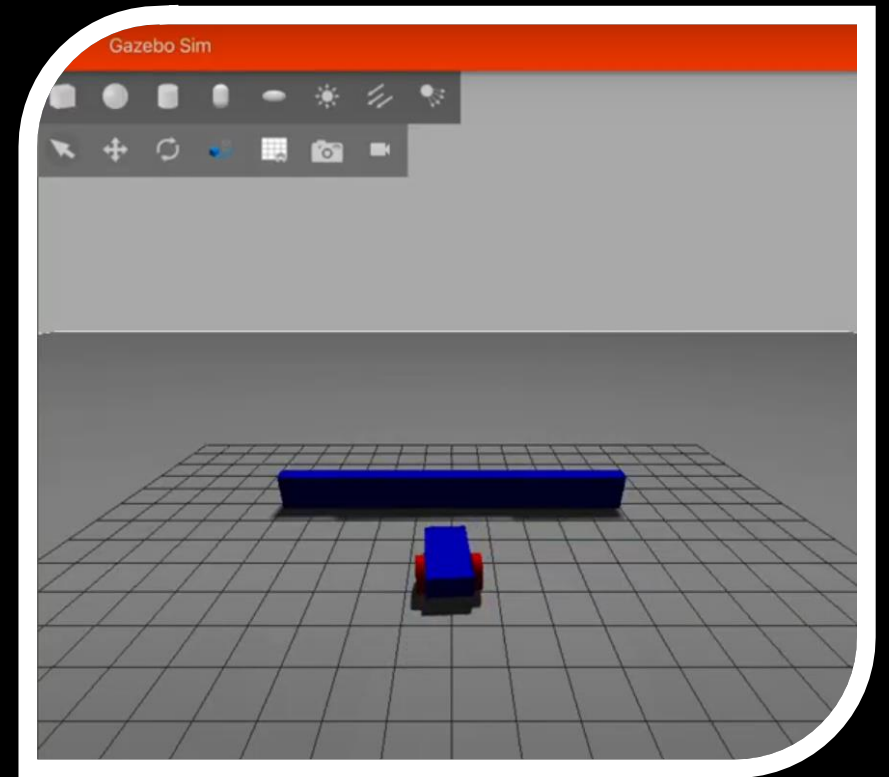
Linear Acceleration

GAZEBO - SENSORS

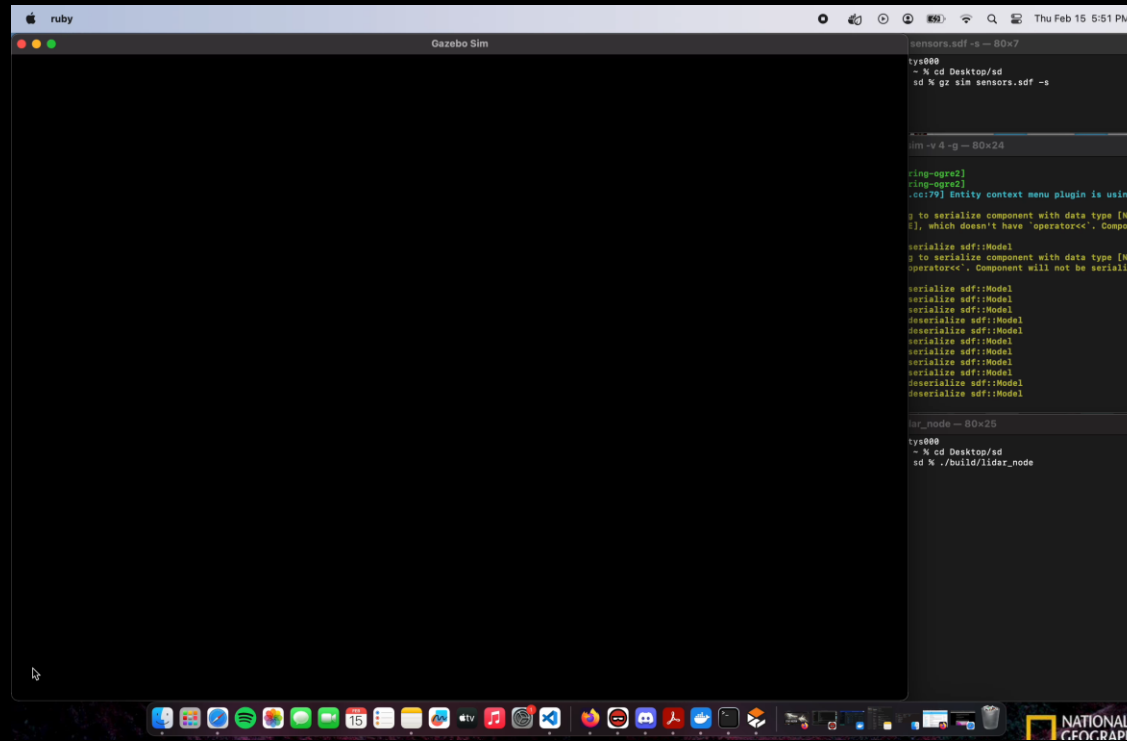
IMU

Contact Sensor

Lidar



GAZEBO



The screenshot shows a macOS terminal window with a dark background. The window title is "ruby" and the active application is "Gazebo Sim". The terminal displays the following commands and output:

```
sensors.sdf -s -- 80x7
tys008
- % cd Desktop/sd
sd % gz sim sensors.sdf -s

sim-v4-g -- 80x24

ring-ogre2]
cimg-ogre2]
.cc:79) Entity context menu plugin is using
g to serialize component with data type [NT
], which doesn't have 'operator<<'. Compone
serialize sdf::Model
g to serialize component with data type [N3s
operator<<'. Component will not be serializ
serialize sdf::Model
serialize sdf::Model
serialize sdf::Model
deserialize sdf::Model
serialize sdf::Model
serialize sdf::Model
serialize sdf::Model
serialize sdf::Model
deserialize sdf::Model
deserialize sdf::Model

lir_node -- 80x25
tys008
- % cd Desktop/sd
sd % ./build/lidar_node
```

The terminal output includes error messages about serialization and a list of model operations. The macOS dock is visible at the bottom with various application icons.

<https://youtu.be/tBpHy81Juk0>

ADVISOR FEEDBACK

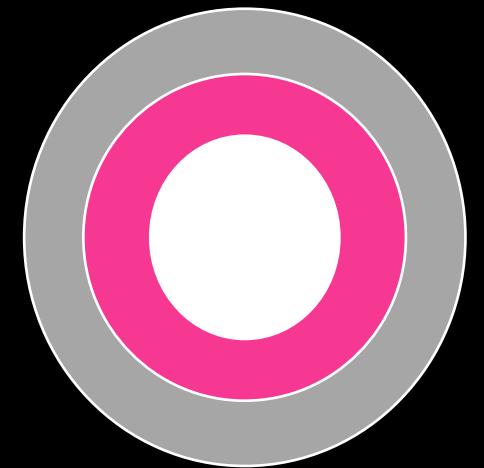
Uncertainty

- Represent uncertainty with gray sphere

Current Sphere



Updated Sphere



CLIENT FEEDBACK

Edit Layout

- Make it more user-friendly
- Reactive page

Load Coordinates:

ClearedPingPoolTest ▾

Sphere Size

Sphere Color:

Mesh Color:

Closest Points

Connected Points

Grid

Delete Selected Spheres

Export Updated Coordinates

Clear Screen

Close Controls



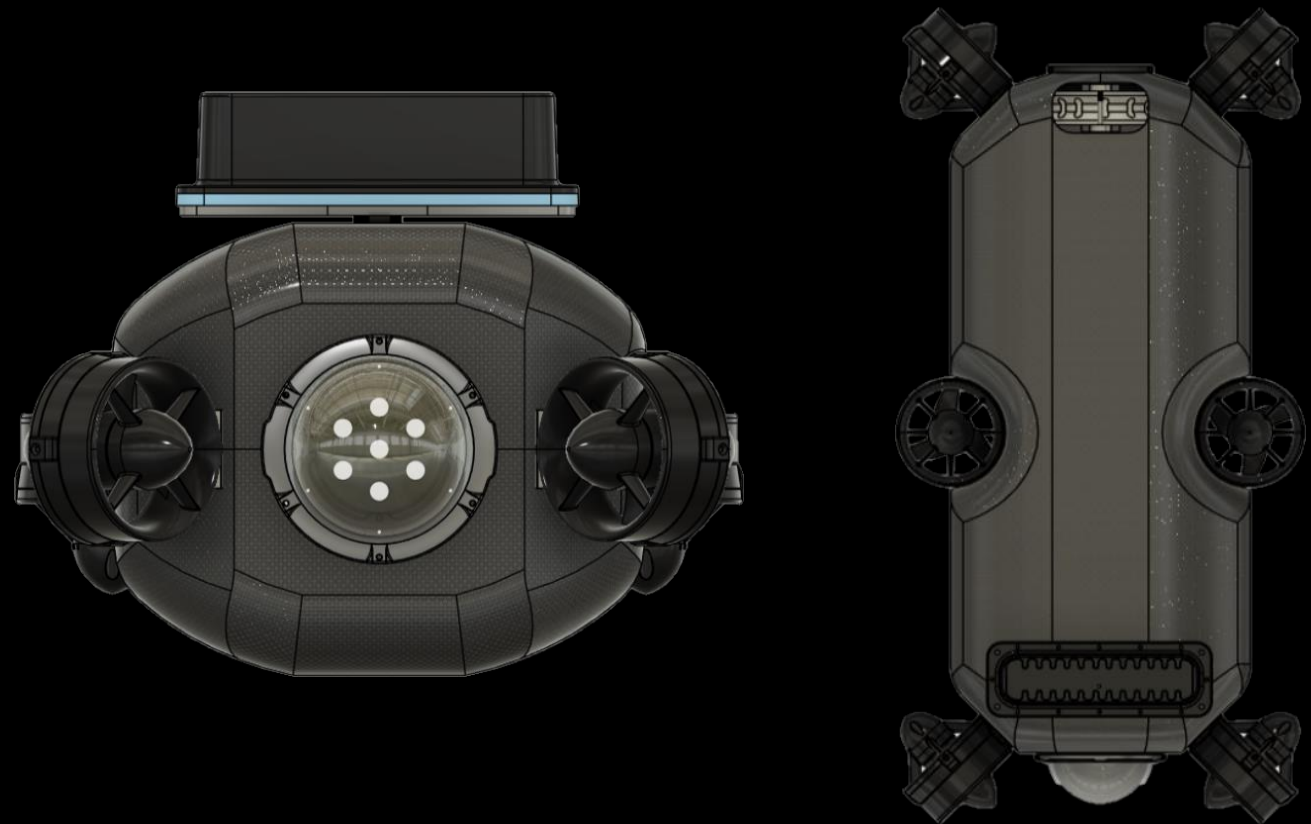


MILESTONE 5

MILESTONE 5:

Task	Michael	Zealand
Multi Fild Upload	Have the ability to upload different file types simultaneously	
Styling	Make the webpage more user friendly.	
Forward Facing Sonar	Retrieve data from new sonar and save the information.	
Autonomy		Utilizing Gazebo as a testing ground for partial pathing using the current data sets we have.

OMNISCAN 450 FS



LIVE DEMO

TEC-V- Cloud Plot

https://bluecodehydra.github.io/3DCloudPlot_Webpage/

WEBPAGE LINK

TEC-V

https://bluecodehydra.github.io/FIT_Project-TEC_V/data.html

QUESTIONS?

